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ABSTRACT

Learning and information management in technology rich environments is a nonlinear process that teachers cannot pretend to control. The University of Central Florida's (UCF) teaching and information management strategies build on metaphors and models borrowed from Dynamical Systems and Complexity Theories to help teachers and others understand learning processes and effectively guide students in complex environments. The UCF Faculty Center for Teaching and Learning and the UCF Library are tracking and analyzing the processes students use for information acquisition, management and application in order to identify strategies that lead to successful learning and those that break down. The result has been a faculty development process that has moved faculty away from a lecture/information distribution model to one that actively engages students in the learning process. Through the use of templates and guidelines, negotiated outcomes, team roles, and phased deadlines, students have begun to accept responsibility for their own learning and are shifting from passive recipients of information to explorers, discoverers, and experimenters. Some faculty embrace the notion of chaos in the classroom, while others fear it. By understanding the teaching approaches that support dynamic learning and the type of students who can benefit from this environment, UCF has been able to create learning alternatives and to maximize the use of high tech environments, making the most flexible available only to those faculty who are prepared to use them. The UCF model for helping faculty maximize the dynamic learning environment can help other institutions move toward a philosophy that embraces students' ability to discover and apply knowledge that is not only contained in a textbook. (AEF)

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Managed Chaos: Learning in Technology Enhanced Environments

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Abstract:

Learning and information management in technology rich environments is a nonlinear process that teachers cannot pretend to control. UCF's teaching and information management strategies build on metaphors and models borrowed from Dynamical Systems and Complexity Theories to help teachers and others understand learning processes and effectively guide students in complex environments.

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Teaching, learning and information management in a technology rich environment is a dynamically different process from the one we THINK occurs in a traditional face-to-face class. Teachers and students have access to unlimited amount of information and infinite possibilities for exploration, discovery, organization, application, interaction and collaboration. The learning and information discovery processes changes in response to a variety of variables including the background information students bring to the classroom, their ability to successfully find, retrieve, organize and apply information; and the people with whom they can interact. Attempts to measure learning in terms of linear progress to a single ending point ignores the dynamic nature of learning and ignores the processes involved in learning how to learn through technology.

It imperative that teachers understand the learning and information management PROCESSES. Teachers once assumed they were the sole source of information for a given class period. Now technology has personalized the learning process, opening doors to exploration, discovery, and application process that personalizes the learning experience … transforming it into a personal, active and even chaotic experience. Even in the largest classrooms students can apply information rather than simply receive it using wireless access to the Internet, the proliferation of laptop computers, and the appearance of dynamic reading devices such as RocketBooks, SoftBooks and Microsoft Reader for PDAs.

Teachers must be able to envision the opportunities for acquisition and application of new knowledge that exist because technology has become so prevalent in the learning environments. They must give up the (false) sense of control they have had over the learning process and develop new strategies for guiding students in learning environments that gives students virtually unlimited opportunities.

If they don't, we will continue to meet at national meetings and discuss techniques for closing laptops or otherwise disengaging students from "distracting" technologies so to reduce misbehavior during lectures and other teaching techniques that demand passive behavior and reception.

Use of fractals and the applications of chaos/complexity theory metaphors and models help faculty visualize the dynamics of the learning process as realized through iterations of interactions between people, information, and events. These models also help faculty realize that learning is not a linear process and cannot be constrained by the artificial boundaries and limitations of the traditional classroom-based learning experience.

Through the exploration of metaphors such as phase space, trajectories, dependence on initial conditions, and lagged time teachers reach an understanding

of how learning may occur in a dynamic environment and can begin to build guidelines that *expand* learning possibilities rather than constrain them. The result is a system that focuses more on learner needs and depends less on the teacher as the source of all wisdom.

I. The history and definition of the concept of chaos; deterministic chaos examines the development of change over time.
   a. Multidisciplinary
   b. Characteristics of chaos: Non-linearity, dynamic
   c. The role of randomness:
      i. In the processes of learning and knowledge acquisition and management, CHOICES play a vital role.
      ii. The butterfly effect

II. Exercise mapping the role of variables, choices and chaos leading to a decision point in participants' lives.

UCF The Faculty Center for Teaching and Learning and the UCF Library are tracking and analyzing the processes students use for information acquisition, management and application in order to identify strategies that lead to successful learning and those that breakdown. The result has been a faculty development process that has moved faculty away from a lecture/information distribution model to one that actively engaged students in the learning process. Through the use of templates and guidelines, negotiated outcomes, team roles, and phased deadlines, students have begun to accept responsibility for their own learning and are shifting from passive recipients of information to explorers, discoverers and experimenters.

I. Examples:
   a. Students are responsible for knowledge acquisition and management; Instructors partner with the Library and other units on and off campus to create opportunities for students to acquire knowledge; Instructor and student choices are important variables in the process.
   b. Possible choices for students and instructors appear infinite; selection and rejection of information are vital.

II. Exercises:
   a. Construction of a model (using a template) demonstrating student choices and variables for acquisition of content and knowledge.

b. Construction of a model demonstrating instructor patterns for knowledge acquisition.

Some faculty embrace the notion of chaos in the classroom, others fear it. The fractal model opens the eyes of some to the dynamics of learning with technology while it causes others to retreat to a more comfortable approach that limits the types of information and learning activities to which students have access. An analysis of teaching and learning styles confirms that dynamic approaches to teaching and learning is not appropriate for everyone nor for every learning need. By understanding the teaching approaches that support dynamic learning and the type of students who can benefit from this environment we have been able to create learning alternatives and to maximize the use of high tech environments, making the most flexible available only to those faculty who are prepared to use them. We have also been able to better advertise the type of learning that will take place in different classes in order to attract students who can benefit from the opportunities and strategies. One size does not fit all and our understanding of dynamical learning environments has allowed us to increase the diversity of our course offerings, including more that encourage a shift to lifelong learning and information strategies while retaining and improving those that respond to the need for receptive learning opportunities.

I. Exploration: Styles, strategies, and processes

II. Exercises:

a. Exploration of personal learning strategies and learning processes

b. Matching of appropriate technologies to strategies and processes

Our interviews with institutions that have adopted notebook programs, studio classroom programs and other technology-rich learning environments have yielded warnings about the "mischief" students can get into when technology can spirit them away from a boring (read "lecture") session. Our findings indicate that by embracing the chaos of the learning and information acquisition environment we can free the learners to learn from each other and from a variety of information sources and models while helping them to develop higher level thinking skills. The UCF model for helping faculty maximize the dynamic learning environment can help other institutions move a way from the philosophy of "shutting the laptop to keep the students focused" to one that embraces their ability to discover and apply knowledge that is not only contained in a textbook.

I. Example: The UCF Model

II. Exercise: Design of personal models that will allow your institution to integrate technology and personal learning strategies WITHOUT chaos

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Abstract

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